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# Proceedings of regional peer review meeting on the Assessment of the Estuary and Gulf of St. Lawrence (4RST) Capelin stock in 2012

February 28, 2013
Maurice Lamontagne Institute

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**Foreword**

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

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*MPO. 2013. Compte rendu de l'examen regional par des pairs portant sur l'évaluation du stock de capelan de l'estuaire et du golfe du Saint-Laurent (Divisions 4RST) en 2012; 28 février 2013. Secr. can. de consult. sci. du MPO, Compte rendu 2013/011.*

## SUMMARY

This document contains the proceeding from the meeting held within the regional assessment of the Estuary and Gulf of St. Lawrence (Divisions 4RST) Capelin Stock. This review process was held on February 28th, 2013 at the Maurice Lamontagne Institute in Mont-Joli. This meeting gathered thirty participants from sciences to management to industry. This proceeding contains the essential parts of the presentations and discussions held and relates the recommendations and conclusions that were presented during the review.

## SOMMAIRE

Ce document renferme le compte rendu de la réunion tenue dans le cadre du processus régional d'évaluation du stock de capelan de l'estuaire et du golfe du Saint-Laurent (Divisions 4RST). Cette revue, qui s'est déroulée le 28 février 2013 à l'Institut Maurice-Lamontagne à Mont-Joli, a réuni une trentaine de participants des sciences, de la gestion et de l'industrie. Ce compte rendu contient l'essentiel des présentations et des discussions qui ont eu lieu pendant la réunion et fait état des recommandations et conclusions émises au moment de la revue.

## INTRODUCTION

The Quebec Region of the Department of Fisheries and Oceans (DFO) is responsible for assessing the stocks of several exploited fish and invertebrate species in the Estuary and Gulf of St. Lawrence. Most of these stocks are assessed periodically within a regional advisory process, which is conducted at the Maurice Lamontagne Institute in Mont-Joli. This document consists of the proceedings of the meeting held on February 28, 2013, on the assessment of the Estuary and Gulf of St. Lawrence (Divisions 4RST) capelin stock.

The objective of the review was to determine whether there were any changes in the resource's status and whether adjustments were required to the management plans based on the chosen conservation approach, the ultimate goal being to provide scientific advice on managing the capelin stock in the Estuary and Gulf of St. Lawrence (4RST) for the 2013 and 2014 fishing seasons.

These proceedings report on the main points discussed in the presentations and deliberations stemming from the activities of the stock assessment regional committee. The regional review is a process open to all participants who are able to provide a critical outlook on the status of the assessed resources. In this regard, participants from outside DFO are invited to take part in the committee's activities within the defined terms of reference for this review (Appendices 1 and 2). The proceedings also mention recommendations made by the meeting participants.

## CONTEXT

Meeting chairperson Martin Castonguay welcomes the participants. He goes over the peer review's objectives and agenda. After the participants introduce themselves, stock assessment biologist François Grégoire begins his presentation by highlighting the contribution of his collaborators. He displays the meeting agenda and briefly reviews the summary of the last Science Advisory Report. It was decided to go back to a biannual capelin assessment given the species' longevity (four to five years), its importance in the ecosystem, and the increased interest of fishers vis-à-vis this species, as indicated in the last assessment. Capelin stocks on the east coast of Newfoundland and Labrador are also assessed every two years.

## ASSESSMENT OF THE RESOURCE

### THE COMMERCIAL FISHERY IN DIVISIONS 4RST

The biologist presents commercial landings by division, fishing gear and unit area along with the fishery's spatial patterns. Since 2008, capelin landings in NAFO Divisions 4RST have been 11,429 t per year on average. They went from 12,314 t in 2011 to 9,472 t in 2012. Most of these landings are from a seine fishery that is practised on the west coast of Newfoundland (Division 4R).

The decrease in landings recorded in 2012 was especially noticeable in unit areas 4Sw (Quebec's Lower North Shore) and 4Tn (Miscou Bank). In 4Sw, a possible explanation for this decrease is spawning that occurred in deeper waters outside the trap fishing area. In 4Tn, spawning would have occurred before regular seine fishing activities.

- It is noted that the TAC overrun for 2004 to 2006 illustrated in the graph of annual landings by division does not seem to be reflected in the associated table. This has to be checked.
- Some details are provided in order to better understand how the tuck-ring seine works. It is a modified version of the purse seine that works in the same way but has a limited length.
- It is added that the tuck-ring seine is considered a fixed gear. Its integration allowed trap (fixed gear) fishers to better monitor the stock's movement.

## GENETIC STRUCTURE OF CAPELIN IN THE NORTHWEST ATLANTIC

DFO researcher Brian Nakashima (Newfoundland and Labrador) presents the preliminary results of a study on the genetic structure of capelin in the northwest Atlantic. Differences observed between demersal and shoreline spawners and changes in their spawning behaviour and distribution were the impetus for this work to be carried out. The study coverage area and the sampling sites, especially those in the Estuary and Gulf of St. Lawrence, are specified. The study identified several different genetic clusters. For the Gulf of St. Lawrence, the preliminary results suggest the existence of one undifferentiated genetic cluster. This cluster would be genetically distinct from that on the east coast of Newfoundland and Labrador.

- Some clarification is provided regarding sample selection.
- Some samples that are quite different genetically were isolated for closer examination.
- The participants agree that the results obtained for the Gulf of St. Lawrence need further clarification. This is especially the case for the individuals in the Strait of Belle Isle; they may have come from different genetic clusters.
- It is added that according to this study, there may have been strong evidence of differentiation between demersal and shoreline spawners in coastal habitats.
- Also observed is an effect of environmental parameters (e.g. salinity, temperature) regarding choice of spawning site.

## PERFORMANCE OF THE PURSE SEINE FISHERY

A performance index based on catches per unit effort (t/day) in the purse seine fishery is presented for Division 4R and Unit Area 4Tn. The choice of models used to calculate this index was validated by examining the principal diagnostics (e.g. residue normality and homogeneity, etc.).

This index has been rising in Division 4R since 2005 in such a way that recent values are the highest in the series. In the case of 4Tn, there was no significant difference between the annual values.

- This indicator, which is expressed in tonnes per day, reflects the fleet's performance (success). It is not an abundance index for the resource.
- It is noted that the fleet seems to have reached its maximum fishing capacity.
- Some think that it would be interesting to examine this index by period. However, it is noted that the effect of the month looks weak.

## SHRIMPERS' BY-CATCHES

In the shrimp fishery, capelin is a regular by-catch. According to observer data (5% coverage), 149 t of capelin were caught and released in 2012, mostly in the Sept-Îles shrimp fishing area. Since 2000, these by-catches ranged from 77 to 322 t. They are not recorded in the Department's official statistics.

- In anticipation of the next assessment, the situation before 2000 in the various shrimp fishing areas should be examined in order to have a portrait for the entire series.
- Some participants are surprised to see that there are still capelin by-catches in Esquiman despite the changes brought about in relation to the shrimp season.

## CATCHES IN MULTIDISCIPLINARY SURVEYS

Since 1990, the presence of capelin in multidisciplinary bottom trawl surveys extended to the southern Gulf of St. Lawrence (Division 4T). This rise can be explained by the increased presence of capelin near the bottom and/or by a change in abundance and/or dispersion.

An index measuring capelin dispersion, not abundance, in multidisciplinary bottom trawl surveys has shown a clear upward trend since 1990. The values measured since 2010 are the highest in the series.

- It is mentioned that capelin is one of the most often caught species in multidisciplinary bottom trawl surveys in the southern Gulf.
- It is agreed that capelin (an increased presence) was observed moving toward the bottom. Some associate this observation with a change in temperature and/or a decrease in predation.

Similarity analyses indicate that the association between capelin and its main predators in multidisciplinary surveys in the northern Gulf differ based on predator abundance and distribution in such a way that in recent years, in August, this association was more related to Greenland halibut and American plaice than to redfish and cod.

## LENGTH FREQUENCY AND AVERAGE LENGTH

The biologist reviews the length frequencies and average lengths observed for capelin in the Gulf of St. Lawrence and on the east coast of Newfoundland.

On the west coast of Newfoundland, the length of capelin caught by seine fishers decreased from the early 1990s to 2001. It then increased and the lengths measured since 2005 are near historical averages. The length of capelin on the east coast of Newfoundland decreased more significantly and since the mid-1990s, has been similar to that of capelin in the Gulf.

- It is mentioned that changes in the age composition may be responsible for the difference observed in the decrease in average lengths of capelin on the east coast of Newfoundland.
- It seems that capelin spawn at an increasingly younger age.
- It is stated that the worse condition of capelin may be related to less favourable environmental conditions.

## CONCLUSION

### RESEARCH IDENTIFICATION AND PRIORITIZATION

Research requirements were identified. These include:

- a thorough review of the limits regarding the current capelin assessment;
- the implementation of a spring acoustic survey on the west coast of Newfoundland and on Quebec's Lower North Shore (alternating with the herring survey);
- a size frequency analysis;
- development of a precautionary approach;
- a review of a European capelin assessment model (Barents Sea) as inspiration for the future.

### Capelin assessment: European model

Mr. Grégoire gives an overview of this model that, in his opinion, is a very good abundance assessment. Capelin assessment is based on an annual acoustic survey and on ecosystem requirements (predation). The participants find this model very inspiring.

### SUMMARY AND RECOMMENDATION

The stock assessment biologist presents the highlights of the assessment and the participants suggest some changes.

- It is important to note that the recent values of the purse seine performance index are the highest in the series.
- With regard to the pronounced decrease in the average length of capelin on the east coast of Newfoundland, it is suggested to state in the report that the possible cause is a reduction in age structure.
- Some changes are made to the explanation of the increase in capelin presence in the multidisciplinary surveys. This is about the increased presence of capelin near the bottom and/or a change in abundance and/or dispersion.
- The participants decide not to include highlights about the study of the genetic structure of capelin in the northwest Atlantic, given that results are still preliminary. Moreover, the participants did not review the structure in detail.
- As for the recommendation on the dispersion of the fishing effort, although Management considers this recommendation difficult to apply, Science believes that this should be included in the recommendation because it is still quite justifiable scientifically. However, no mention of a specific type of fishery will be made in this recommendation.

### Recommendation

Because of capelin's primary role as a forage species in the marine ecosystem, any increase in TAC in 4RST should be implemented cautiously (i.e. less than 10% of the total for the next two years). The fishing effort should also be more dispersed all along the coast and not just focused locally.

## APPENDICES

### 1- PARTICIPANTS LIST

| Name | Affiliation |
|---|---|
| Archambault, Diane | MPO – Science |
| Ball, Donald | MPO – Fishery Management |
| Beaulieu, Jean-Louis | MPO – Science |
| Benchabane, Samir | MAPAQ |
| Bergeron, Mathieu | MPO – Fishery Management |
| Bernier, Denis | MPO – Science |
| Bourdages, Hugo | MPO – Science |
| Castonguay, Martin | MPO – Science |
| Couillard, Catherine | MPO – Science |
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| Dubé, Sonia | MPO – Science |
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| Gauthier, Johanne | MPO – Science |
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| Hedderson, Carl | Fishermen (NFL) |
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| Robert, Dominique | CFER – Memorial University |
| Savenkoff, Claude | MPO – Science |
| Schwab, Philippe | MPO – Science |
| Simms, Jason | MPO – Fishery Management |
| Spingle, Jason | FFAW – CAW, TN |

## 2- TERMS OF REFERENCE

**Assessment of Gulf of St. Lawrence capelin stock (4RST)**

**Regional Peer Review - Quebec Region**

**February 28, 2013**
**Mont-Joli, Québec**

Chairperson: Martin Castonguay

### Context

In the Estuary and Gulf of St. Lawrence, capelin has traditionally been used as fertilizer, bait or for its oil. Towards the end of the 1970s, the emergence of a Japanese market for roe-bearing females sparked a rapid growth of the fishery with catches that increased from approximately 700 t per year to nearly 10,000 t. In NAFO Divisions 4RST, most catches are made on the west coast of Newfoundland by a fleet of small and large purse seiners and by trap fishermen. Capelin is also caught using traps on Quebec's Lower North Shore and weirs in the St. Lawrence Estuary. In addition to recreational catches made on beaches during the spawning season, capelin are also a by-catch of the shrimp (*Pandalus borealis*) fishery and the groundfish and shrimp multidisciplinary surveys conducted annually in the Estuary and northern and southern Gulf of St. Lawrence.

Even though capelin population structures in the Estuary and Gulf of St. Lawrence are not clearly defined, the species is managed according to two distinct management units, NAFO Divisions 4R and 4ST. A Total Allowable Catch (TAC) of 11,195 t is applied to Division 4R compared with 1,805 t for all of Divisions 4ST. There is no abundance survey specifically directed on capelin. Consequently, it is impossible to calculate spawning biomass, fishing mortality and limit reference points, which would help define, based on the precautionary approach, a strategic framework for the fishery and a TAC.

The last capelin assessment in Divisions 4RST was conducted in 2011. The Fisheries Management Branch requested science advice on this stock for the 2013 and 2014 fishing seasons.

### Objectives

Provide scientific advice on the capelin status in the Gulf of St. Lawrence (Divisions 4RST) to adjust the modalities of the fishery management for the 2013 and 2014 fishing seasons. This review will include:

- An assessment of the distribution of capelin based on:
    - An analysis of the commercial fishery statistics following the 2011 and 2012 fishing seasons (overall distribution of landings and breakdown by division, unit area, month and fishing gear);
    - Calculation of a performance index for the purse seine fishery;
    - An analysis of the biological data collected by port samplers or by observers (size structure and some biological parameters);
    - Calculation of the capelin by-catches by NAFO unit area in the Gulf of St. Lawrence shrimp fishery;

    - Data from the CCGS Teleost research surveys conducted in the northern and southern Gulf of St. Lawrence (dispersion and distribution indices);
- Specific advices relying on the availability of recent and relevant data that can improve the responsible management of stock such as:
    - The presentation of the results and highlights of the genetic study on the northwest Atlantic stock differentiation;
- The identification and prioritization of research projects to be considered for the future.
- Recommendations on acceptable harvest levels for the 2013 and 2014 seasons.

**Expected publications**

- A Canadian Science Advisory Secretariat (CSAS) Science Advisory Report on capelin (4RST).
- CSAS Proceedings summarizing the discussions.
- CSAS Research Document.

**Participation**

- Fisheries and Oceans Canada (DFO) Science and Fisheries Management Branches
- Fishing industry
- Provincial representatives
- Aboriginal communities/organizations